Guneet Singh Dhillon

Curriculum Vitae

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Education

Aug 2014 - May 2018 **University of Texas at Austin**, Austin, TX
B.Sc. in Computer Science with Honors (Turing Scholars Honors)
B.Sc. in Mathematics with Honors **GPA: 3.89 / 4**

- **Honors Thesis**: Training Ising Models on Images using Sparsitron (Advisor - Dr. Adam Klivans)
- **Certificate** : Applied Statistical Modeling
- **Minor** : Economics
- **Programs** : Freshman Research Initiative, Directed Reading Program

Work Experience

Dec 2019 - Current **Applied Scientist II**, *Amazon Web Services, Inc.*, Pasadena, CA

Jul 2018 - Dec 2019 **Applied Scientist I**, *Amazon Web Services, Inc.*, Pasadena, CA

- Devised the algorithm *Transductive Fine-tuning* for few-shot image classification, with Dr. Stefano Soatto (paper under review)
- Devised algorithms that are being used in the *Amazon Textract* product (link)
  - Key-value pair detection: question-answer pairs in forms (e.g. "name" – "Guneet")
  - Table detection: tables and corresponding table cells

May 2017 - Aug 2017 **Software Development Engineer Intern**, *Amazon Web Services, Inc.*, Palo Alto, CA

- Devised the algorithm *Stochastic Activation Pruning* for robust image classification, with Dr. Anima Anandkumar (ICLR publication)
- Implemented the algorithm from *Dense-Sparse-Dense Training for Deep Neural Networks* in MXNet

May 2016 - Aug 2016 **Machine Learning Intern**, *CognitiveScale Inc.*, Austin, TX

- Used probabilistic non-negative matrix factorization and Gibbs sampling techniques to build a search and recommendation system, with Dr. Ayan Acharya

Jan 2016 - May 2016 **Undergraduate Learning Assistant**, *University of Texas at Austin*, Austin, TX

- Held office hours for the course *Matrices and Matrix Calculations* taught by Dr. John Gilbert

May 2015 - Aug 2015 **Software Technology Engineering Intern**, *Dell Inc.*, Austin, TX

- Implemented a Windows 10 Universal App. to connect and share features between multiple devices

Research Papers and Theses

Dec 2019 **Guneet S. Dhillon**, Pratik Chaudhari, Avinash Ravichandran, Stefano Soatto. **A Baseline for Few-shot Image Classification**, (pdf). *Under review at the International Conference on Learning Representations (ICLR), 2020; Short version in Proc. of the Workshop on Meta-Learning, Conference on Neural Information Processing Systems (NeurIPS), 2019*.

Mar 2018 **Guneet S. Dhillon**, Kamyar Azizzadenesheli, Zachary C. Lipton, Jeremy Bernstein, Jean Kossaifi, Aran Khanna, Anima Anandkumar. **Stochastic Activation Pruning for Robust Adversarial Defense**, (pdf). *In Proc. of the International Conference on Learning Representations (ICLR), 2018; Short version in Proc. of the Machine Deception Workshop, Conference on Neural Information Processing Systems (NeurIPS), 2017*.

May 2018 **Guneet S. Dhillon**. **Training Ising Models on Images using Sparsitron**, (pdf). *Undergraduate Honors Thesis (Advisor: Dr. Adam Klivans), 2018*.

Research Projects

Jan 2016 - Dec 2017 **Clustering and Prediction in Time-series Data**, with Dr. Sinead Williamson
Clustering time-series data and predicting future values by modeling the data using an infinite mixture of probabilistic auto-regressive models, learned using Gibbs sampling techniques

Nov 2017 - Dec 2017 **Generative Adversarial Networks (GANs) for Adversarial Training**, (pdf), course project
Robust image classification using a generator-discriminator formulation to train deep learning models

Nov 2016 - Dec 2016 **Conflict Graphs for Parallel Stochastic Gradient Descent**, (pdf), course project
Training SVMs by exploring conflict graphs to parallelize stochastic gradient descent training

Jan 2015 - May 2015 **Genetic Algorithms for Efficient 3D Printing**, course project
Minimizing the overhang region in 3D printing using genetic algorithms to find optimal slicing planes

Apr 2015 - May 2015 **Efficient Thread Scheduling**, course project
Reducing the wait-time for threads by scheduling them based on past CPU and I/O time

Honors and Awards

Aug 2017 - May 2018 Out-of-State Tuition Waiver, CNS, UT Austin
Aug 2017 - May 2018 Thomas and Elizabeth Merner Scholarship in Natural Sciences, CNS, UT Austin
Aug 2017 - May 2018 Angus G. and Erna Pearson Endowed Undergraduate Scholarship, Dept. of CS, UT Austin
Apr 2018 College Scholar, CNS, UT Austin
Aug 2016 - May 2017 Motorola Endowed Scholarship, Dept. of CS, UT Austin
Apr 2017 College Scholar, CNS, UT Austin
Aug 2015 - May 2016 Angus G. and Erna Pearson Endowed Undergraduate Scholarship, Dept. of CS, UT Austin
Aug 2015 - May 2016 General Financial Aid Scholarship, International Student and Scholar Services, UT Austin
May 2015 - Aug 2015 TIDES FRI Summer Research Fellowship, CNS, UT Austin
Aug 2014 - May 2015 Freshman Scholarship, CNS, UT Austin
Aug 2014 - May 2015 Schein Memorial Scholarship, Dept. of CS, UT Austin

Coursework

Graduate Courses
UT Austin, 2016-17
: Convex Optimization (Constantine Caramanis), Numerical Analysis: Linear Algebra (George Biros), Linear Models (Peter Müller)

Undergraduate Courses
UT Austin, 2014-18
: Honors Statistics: Honors (James Scott), Introduction to Data Mining (Adam Klivans), Algorithms and Complexity: Honors (Eric Price), Geometric Foundations of Data Science (Chandrajit Bajaj), Introduction to Stochastic Processes (Stephen Walker), Machine Learning / Vision: Honors (Kristen Grauman), Artificial Intelligence: Honors (Peter Stone), Computational Intelligence in Game Research I & II (Cem Tutum), Introduction to Quantum Information Science (Scott Aaronson), Randomized Algorithms (David Zuckerman), Differential Equations with Linear Algebra: Honors (Dan Knopf), Real Analysis I (Hector Lomeli), Introduction to Probability and Statistics (Sinead Williamson), Matrices and Matrix Calculations (John Gilbert), Financial Economics (Svetlana Boyarchenko), Introduction to Game Theory (Dale Stahl), Microeconomic Theory (Gerald Oettinger), Discrete Mathematics: Honors (Isil Dillig), Data Structures: Honors (Calvin Lin), Principles of Computer Systems: Honors (Ahmed Gheith), Computer Organization and Architecture: Honors (Ahmed Gheith),

Audited Courses
Caltech, 2018-19
: Linear Algebra and Convexity (Joel Tropp), Foundations of Machine Learning (Anima Anandkumar)

Talks and Presentations

A Baseline for Few-shot Image Classification

Dec 2019 Workshop on Meta-Learning, Conference on Neural Information Processing Systems (NeurIPS)
Jul 2019 Computer Vision Services / Systems in Amazon, Amazon Machine Learning (AMLC)
Jul 2019 Data-Efficient Learning Techniques for Amazon Scale, Amazon Machine Learning Conference (AMLC)

Other Activities

Jan 2014 - May 2018 Member of the Sikh Student Association, UT Austin
Aug 2014 - May 2018 Member of the Turing Scholars Student Association, UT Austin
Aug 2016 - May 2017 School Relations Director for the Undergraduate Machine Learning Labs, UT Austin
Oct 2016 Participated in the Electronic Trading Challenge, UT Austin; Secured seventh position
Jan 2015 - May 2016 Member of the Texas Table Tennis Team, UT Austin; Secured an NCTTA Rank of 689
Feb 2016 Participated in the dataHACK, UT Austin; Secured fourth position and an honorable mention
Aug 2014 - Dec 2015 Member of the Longhorn Cricket Club Team, UT Austin